Supplementary material

Direct imaging of in vivo neuronal migration in the developing cerebellum

Reinhard W. Köster and Scott E. Fraser

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Movie 1

Movie showing the migration of labeled URL cells along their pathway toward the MHB and their subsequent ventral migration along the MHB to the ventral brainstem. As the movie begins, unipolar URL cells project process toward the MHB. When leaving the URL, cells stay connected with the URL by leaving a trailing process behind. Upon reaching the MHB, URL cells join into a ventrally oriented migratory pathway along the MHB to eventually settle in the ventral brainstem region. Cells from the anterior region of the lower rhombic lip migrate anteroventral to settle in the ventral brainstem underneath the cerebellum close to the URL descendants. URL cells marked with pink and blue dots in Figure 2 have been encircled in the movie; an arrow marks the LRL descendants that settle in the ventral brainstem (green dots in Figure 2). Three-dimensional volumes were collected every 15 min. Each volume consisted of nine individual sections captured at 5 μm intervals.

Movie 2

Time-lapse movie showing the changes in morphology and migratory behavior once a URL-derived neuronal precursor cell arrives at the MHB. A URL-derived neuronal precursor cell (arrow) migrates in an anterior direction toward the MHB. Upon arriving at the MHB (arrow), the trailing process is pulled in (arrowhead), which results in a cell polarity change of the migrating neuronal precursor cell from a bipolar to a unipolar cell polarity. In addition, the neuronal precursor cell extends a long process, likely an axon, along the MHB (arrow). Three-dimensional volumes were collected every 12 min. Each volume consisted of 11 individual sections captured at 2 μm intervals.